(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
18 April 2002 (18.04.2002)

PCT

(10) International Publication Number
WO 02/32159 A2

(51) International Patent Classification[7]: H04Q 7/00

(21) International Application Number: PCT/EP01/11384

(22) International Filing Date: 2 October 2001 (02.10.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0024677.7 9 October 2000 (09.10.2000) GB

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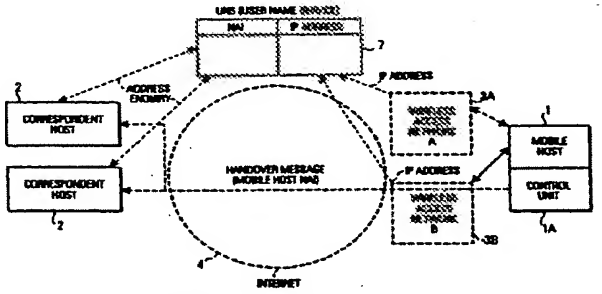
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: MOBILE HOSTS



(57) Abstract: The present invention relates to a system having a mobile host (1) which can attach to different access networks (3A, 3B) for carrying on an active communications session with a correspondent host (2). The mobile host (1) has an identifier (NAI) which is independent of the access network (3A, 3B) to which the mobile host (1) is attached, but is assigned a communications address(IP Address) for carrying on an active communications session with a correspondent host (2), which address changes for example depending on the access network (3A, 3B) to which the mobile host (1) is attached. The system has a database (UNS User Name Service) which registers the association of the mobile host identifier (NAI) and the current communications address (IP address) of the mobile host (1). The correspondent host (2) is informed of the identifier (NAI) of the mobile host (1) when an active communications session is first established between the mobile host (1) and the correspondent host (2), and the correspondent host (2) accesses the database (UNS) to determine the current communications address of the mobile host (1). In accordance with the present invention, the mobile host (1) is engaged in an active communications session: detects when the communications address (IP address) of the mobile host (1) changes, for example as a result of attachment of the mobile host (1) to a different access network (3A, 3B): and upon detection of such a change of the communications address (IP address), sends a message (HANDOVER MESSAGE) to the recorded correspondent host (2), the message containing the mobile host's (1) identifier (NAI). The correspondent host (2) then uses the identifier (NAI) to access the database (UNS) to obtain the changed communications address (IP address) of the mobile host (1). The invention also provides related methods and mobile hosts.

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Title

Mobile hosts

Technical field of the Invention

The present invention relates to internetwork mobility control for mobile hosts, such as wireless computers, and in particular mechanisms for allowing mobile hosts to maintain active data sessions during handovers between access networks.

Technical background and related art

Wireless mobile access to the Internet is expected to represent an increasingly important segment of the communications industry. Access to the Internet will be offered, for example for wireless connection enabled laptop and palmtop computers, by a variety of wireless access network operators. Wireless access networks typically have a number of wireless base stations and mobile hosts, e.g. wireless enabled mobile computers acting as mobile Internet hosts, can connect to one or more of these base stations at any time and use it or them to relay data to/from a correspondent host or hosts, for example in the wired network. Due to mobility, a mobile host may sometimes need to release its connection to a base station and establish a connection to another base station. If this action happens during an active data session, the network must ensure that there is little disturbance to the ongoing communication between the mobile host and the correspondent host or hosts. The mechanisms that support such a mobility of a mobile host are referred to as handover.

The geographical areas covered by different access networks often overlap, thus allowing for quick migration from one network to another one. A mobile host may sometimes need to

perform a handover between base stations that belong to two different networks. The term "inter-network handover" is used herein to refer to a mobile host's moving from one access network to another access network during an active data session. Due to inherent characteristics of the Internet Protocol (IP) a movement of a mobile host between different access networks necessarily involves a change of the mobile host's IP address. However, a change of an Internet host's IP address during an active data session breaks the ongoing session. Special mechanisms are therefore required that allow mobile hosts to move between access networks during active data sessions.

The so-called Mobile IP protocol represents a mechanism that allows a mobile host to maintain an active data session during migration from one access network to another, even though the mobile host needs to change its IP address. In this solution a static anchor point (referred to as Home Agent) is assigned to mobile hosts. Correspondent hosts willing to send packets to a mobile host need to transmit packets to its Home Agent which, in turn, forwards packets to the mobile host's actual location. When the mobile host moves to a new network and is assigned a new IP address, it must inform its Home Agent. In a variant of this protocol, referred to as Mobile IP with Route Optimization, the correspondent hosts or nodes are allowed to send packets directly to the mobile host's actual location thus eliminating need to use Home Agents for the forwarding of each packet. The first (or first few) packets of a data session, however, are still forwarded to the mobile host through its Home Agent. In this variant of the Mobile IP protocol, mobile hosts must also notify correspondent hosts after migrations from one access network to another.

The drawback of the Mobile IP protocol, with or without Route Optimization, is the need for a statically allocated

Home Agent. The use of Home Agent ties the operation of a mobile host to its home network even when its actual location is a long distance from its home. Messages exchanged between the mobile host and its Home Agent may travel a long way and consume a significant amount of network resources in addition to suffering delay. The Route Optimization variant of Mobile IP removes the need to forward all packets through the Home Agent but it requires, in exchange, a security association between the mobile host and a correspondent host. In addition, it does not eliminate the need to inform the Home Agent when migration between access networks takes place, since communication sessions still start by forwarding packets through the Home Agent.

Home Agents can be avoided if correspondent hosts send their packets directly to a mobile host's actual IP address at all times. A mechanism that supports this has been proposed which uses a (possibly distributed) database that maps Network Access Identifiers (NAI) of mobile users to IP addresses. Herein, this database will be referred to as User Name Service (UNS). Correspondent hosts willing to communicate with a mobile host can contact this database and obtain the actual IP address of their called party, i.e. the mobile host. Using this mechanism, however, a mobile host cannot maintain its active data session when it moves to a new network and changes its IP address. The mechanism only supports migrations between data sessions.

Summary

Problem addressed by the present invention

The primary problem addressed by the present invention is that of enabling a mobile host to maintain active data sessions during handovers between access networks, without relying on Home Agents.

Solution provided by the present invention

The present invention provides a system having a mobile host which can attach to different access networks for carrying on an active communications session with a correspondent host. The mobile host has an identifier which is independent of the access network to which the mobile host is attached, but is assigned a communications address for carrying on an active communications session with a correspondent host, which address changes for example depending on the access network to which the mobile host is attached. The system has a database which registers the association of the mobile host identifier and the current communications address of the mobile host. The correspondent host is informed of the identifier of the mobile host when an active communications session is first established between the mobile host and the correspondent host, and the correspondent host accesses the database to determine the current communications address of the mobile host. In accordance with the invention, the mobile host comprises a control unit which

maintains a record of the correspondent host with which the mobile host is engaged in an active communications session,

detects when the communications address of the mobile host changes, for example as a result of attachment of the mobile host to a different access network, and

upon detection of such a change of the communications address, sends a message to the recorded correspondent host, the message containing the mobile host's identifier.

The correspondent host then uses the identifier to access the database to obtain the changed communications address of the mobile host.

In addition to the system set out above, the present invention also provides related methods and mobile hosts.

Advantages of the invention

The present invention provides that mobile hosts can maintain active data sessions during inter-network handovers without the use of Home Agents, and without the use of similar agents, such as foreign agents or roaming agents. Further, embodiments of the present invention can be implemented such that mobile hosts are not required to maintain security associations with their correspondent hosts.

It will be understood that although the present invention is primarily concerned with maintaining active data sessions during inter-network handovers, embodiments of the invention can be used to maintain active data sessions in other circumstances in which the address (IP address) of a mobile host changes.

Brief description of the drawings

Figure 1 schematically illustrates a prior art system using Mobile IP protocol and a Home Agent;

Figure 2 schematically illustrates a prior art system similar to that of Figure 1 but employing the Route Optimization variant of Mobile IP protocol;

Figure 3 schematically illustrates a prior art system which does not employ a Home Agent;

Figure 4 schematically illustrates a system in accordance with a first embodiment of the present invention; and

Figure 5 schematically illustrates a system in accordance with a second embodiment of the present invention.

Detailed description of preferred embodiments

Before proceeding to description of preferred embodiments of the present invention, aspects of prior art systems will first be described with reference to Figures 1 to 3.

Figure 1 illustrates a prior art system which uses Mobile IP protocol and a Home Agent for communications between a mobile host and a correspondent host via a wireless access network, and the Internet.

When a mobile host 1H is communicating with a correspondent host 2 via its home wireless access network 3H, and the Internet 4, the IP address of the mobile host 1H is a fixed home address which points to the home network 3H. With the mobile host 1H on its home network it can operate as though it had a fixed connection with the Internet, without need for any special mobile IP considerations. Thus, communications or data packets can pass to and from the correspondent host 2 and mobile host 1H directly. The functionality of the Home Agent 5, shown in Figure 1, associated with the home wireless access network is not needed for handling this direct communication, although Figure 1 shows that communications pass through the Home Agent 5.

However, when a mobile host 1F is communicating with correspondent host 2 by way of a foreign wireless access network 3F, and the Internet 4, packets from the correspondent host 2 are still sent to the home address, pointing to the home network 3H, of the mobile host 1F. In one variant of mobile IP (referred to as basic mobile IP) to enable communications or packets to pass from the correspondent host 2 to the mobile host 1F, on the foreign wireless access network 3F, the Home Agent 5 associated with the home network 3H and a foreign agent 6 associated with the foreign mobile access network 3F are provided.

When the mobile host 1F attaches to the foreign access network 3F, the foreign agent 6 offers an IP address to the mobile host 1F for use in a data session. This address offered by the foreign agent 6 is a so-called care-of address which differs from the home address of the mobile host 1F, to which home address packets from the correspondent host 2 destined for the mobile host 1F are all sent. The mobile host 1F sends registration messages to the foreign agent 6, which in turn forwards them to the Home Agent 5, which messages identify the care-of address now used by the mobile host 1F. In response, the home agent registers the care-of address in association with the home address of the mobile host 1F.

Now, when the Home Agent 5 receives packets from the correspondent host 2, destined for the mobile host 1F and addressed with the home address of the mobile host, it "encapsulates" the received packets, providing a new packet header which uses the registered care-of address as the destination IP address for the encapsulated data. The encapsulated data is then forwarded, via the Internet, to the foreign agent 6. This forwarding of the encapsulated data, is called IP Tunneling. The foreign agent 6 "decapsulates" the received packets, to recover the original packets and directs them to the mobile host 1F via the foreign wireless access network 3F

Another variant of mobile IP, referred to as Mobile IP with co-located care-of address, has also been developed. This variant does not use foreign agents. In this variant the care-of address is a local address assigned to the mobile host using, for example, DHCP (Dynamic Host Configuration Protocol) or stateless autoconfiguration in IPv6 (Internet Protocol Version 6). Mobile hosts send their registration messages directly (i.e. not via foreign agents) to Home Agents and encapsulated packets arrive directly from the Home Agents (i.e. not via foreign agents) at the mobile

hosts, which are responsible for the decapsulation.

The prior art system (basic Mobile IP) illustrated in Figure 1 has the disadvantages that, although data or packets from the mobile host 1F, attached to the foreign wireless access 3F can pass in a sense directly to the correspondent host 2, data or packets from the correspondent host 2 to the mobile host 1F must follow an indirect or two-part path via the Home Agent 5. The Home Agent 5 may be distant from the foreign host 6, which involves delay in passing packets, and considerable network resources may by taken up in forwarding data or packets from the Home Agent 5 to the foreign agent 6. Further, provision the Home Agent 5 also represents a considerable additional overhead for the system. Similar disadvantages also apply to the "Mobile IP with co-located care-of address" variant which is briefly described above.

Figure 2 illustrates a development of the system of Figure 1, in which the disadvantages of the system of Figure 1 are partially overcome.

In this development, a binding cache 2A is associated with the correspondent host 2. Initially, passage of data or packets between mobile host 1F and correspondent host 2 occurs as in the system of Figure 1, and again the mobile host 1F, possibly with the assistance of the foreign agent 6, sends a registration request to the Home Agent 5, which request identifies the care-of address now used by the mobile host 1F. In response, the home agent again registers the care-of address in association with the home address of the mobile host 1F. However, in the system of Figure 2, binding information, identifying the association of the care-of address with the home address of the mobile host 1F, is then passed to and stored in the binding cache 2A.

With this binding information the correspondent host 2 is able to "encapsulate" packets intended for the mobile host 1F, providing a new packet header which uses the registered care-of address as the destination IP address for the encapsulated data. The encapsulated data is then forwarded directly (IP Tunneling), via the Internet, to the foreign agent 6 without use being made of the home agent. The foreign agent 6 again "decapsulates" the received packets, as in the system of Figure 1, to recover the original packets and directs them to the mobile host 1F via the foreign wireless access network 3F.

The system of Figure 2, after the initial phase, can avoid the delay and resource take-up disadvantages of the system of Figure 1, but does not avoid the Home Agent overhead, and introduces a new overhead in the form of the binding cache 2A.

Figure 3 illustrates a further development in which the need for a Home Agent is avoided.

In the system of Figure 3, use is made of a so-called User Name Service (UNS) 7. In the system of Figure 3A, a mobile host 1 is identified by a Network Access Identifier (NAI), which may have the form "USERNAME@DOMAIN", which, when the mobile host 1 wishes to communicate with the correspondent host 2, is passed to the correspondent host 2. Further, when the mobile host 1 attaches to a wireless access network 3A or 3B and is offered an IP address by that access network, the access network forwards the association of the Network Address Identifier (NAI) of the mobile host, together with the IP address offered to the mobile host, to the User Name Service (UNS) 7, which is a database of such associations of NAI's and IP addresses. The correspondent host 2, having received the NAI passed to it from the mobile host 1, can then look up the association of that NAI with IP address in the UNS 7 database and then send packets

to the IP address associated with the NAI of the mobile host 1. In this way, the need for a Home Agent is avoided, even at the initial stage of a communication session between mobile host 1 and correspondent host 2.

However, although the "Home Agent" prior art systems of Figures 1 and 2 can allow a mobile host to maintain an active data session during migration from one access network to another, even though the mobile host needs to change its IP address, this is not the case in system of Figure 3.

In the systems of Figure 1 and 2, when the mobile host moves to a new network and is assigned a new IP address, the Home Agent is informed of the new address, for example by a foreign agent of the new network. In the system of Figure 1, the Home Agent then tunnels packets to the new address, whilst in the system of Figure 2 the binding information in the binding cache is updated by the Home Agent, so that the correspondent host 2 can then send packets to the new address. It is possible that some packets from the correspondent host 2 which are "in flight" (to the old IP address of the mobile host) when the new IP address is assigned to the mobile host may be lost, but the active data session can be maintained. It is possible that, in the systems of Figures 1 and 2, agents (e.g. foreign agents) may cooperate to forward "in flight" packets from the old IP address to the new IP address of the mobile host.

In the system of Figure 3, however, the mobile host relying upon its Network Access Identifier (NAI) must end all its active data sessions before migrating to a new access network, and the restart data sessions after migration, registering its new NAI-IP address association in the UNS 7 database.

Figure 4 illustrates a system in accordance with a first embodiment of the present invention. In this system, the mobile host 1 is provided with a control unit 1A. The control unit 1A is a part of the mobile host 1. It can be implemented either in hardware or in software. In this system use is also made of a User Name Service (UNS) 7. The User Name Service (UNS) 7 employed in an embodiment of the present invention may, as in the system of Figure 3, make use of Network Access Identifiers (NAIs) for identifying mobile hosts. However, in embodiments of the invention, other types of identifier may be used. The use of NAIs in embodiments of the invention is merely one example of a type of identifier which may be employed.

The control unit 1A of the mobile host operates as follows:-

1. The control unit 1A maintains a list of correspondent hosts 2 with which the mobile host 1 is engaged in active communication session.

2. The control unit 1A monitors the mobile host's 1 network connection and notices when the mobile host 1 has changed its IP address, for example upon migration from wireless access network 3A to wireless access network 3B, as illustrated in Figure 4.

3. Upon a change of IP address, the control unit 1A sends a message to each of the correspondent hosts 2 with which the mobile host is actually engaged in a data session. In Figure 4 this message is indicated by "HANDOVER MESSAGE" (The message can conveniently reuse the Internet Control Message Protocol (ICMP) format, but it can also take another format.) The message contains the mobile hosts identifier (e.g. NAI)

which is used in the User Name Service (UNS) 7.

The correspondent hosts 2 can now use this identifier to contact the User Name Service (UNS) 7 and obtain the new IP address of the mobile host..

Thus, in accordance with this embodiment of the invention, an inter-network handover is performed as follows. The mobile host 1 moves to the new access network (e.g. to 3B from 3A) and obtains a new IP address. The new IP address is communicated to the User Name Service, as indicated in Figure 4. The control unit 1A sends messages to each host 2 with which the mobile host 1 has an active communication session. These correspondent hosts 2 learn the mobile host's new IP address from the UNS 7, using the information found in the messages from the control unit 1A. Subsequent data packets from these correspondent hosts 2 to the mobile host 1 are directly sent to the mobile host's new IP address.

In accordance with the embodiment of the present invention illustrated in Figure 5 the messages ("HANDOVER MESSAGE") from the control unit 1A to the correspondent hosts 2 also contain the new IP address itself of the mobile host 1. In this embodiment however, this IP address information will need to be authenticated and possibly encrypted in order to prevent malicious hosts from manipulating mobility information. Correspondent hosts 2 that have no security association with the mobile host 1 cannot decode the authentication (and/or decrypt the information) and must rely on contacting the UNS 7.

From the above it will be appreciated that in an embodiments of the present invention a mobile host has no location independent (home) IP address. The mobile host is assigned a temporary IP address that has a location significance. However, a location independent

identification of the mobile host is provided by and identifier such as an NAI. This removes the need for permanently assigned Home Agents for the routing of data packets to roaming mobile hosts.

In embodiments of the invention, Internet nodes (i.e. correspondent nodes) can obtain the IP address currently associated with a mobile host, based on the mobile host identifier (e.g. NAI). This is important because, as indicated above, the mobile host has no permanent home IP address.

In an embodiment of the present invention a User Name Service (UNS) is employed to resolve mobile host identifiers (e.g. NAI strings) to IP addresses. It will be understood that the mobile host identifier may be a user identifier, i.e. an identifier ultimately associated with the current user of the mobile host rather that the mobile host per se. The UNS may be similar to the Domain Name System in that it translates string identifiers to IP addresses. When a user/mobile host "roams" into the service area of a new access network and receives a new IP address, it sends a notification message with its new IP address to its home UNS server. Authentication of such messages is easy as the user/mobile host is in a natural security association with its home UNS server. In is observed that these notification messages should not be confused with Mobile IP registration messages because they do not change routing of existing sessions and are therefore not time sensitive.

In an embodiment of the present invention a simple protocol can be defined to allow Internet nodes to query IP addresses from UNS servers, similarly to the DNS protocol. Although this mechanism relies on the correspondent node being UNS-aware, this does not contradict backward compatibility. The reason for this is that current Internet

applications typically do not need to initiate communication towards user terminals (e.g. mobile hosts).

It is further observed that besides storing information mapping IP addresses to user/mobile host identifiers (e.g. NAIs), the UNS can be used to store other useful location dependent information such as terminal type, access speed, proxy servers and so on.

Claims

1. A system comprising a mobile host (1) which can attach to different access networks (3A, 3B) of the system for carrying on an active communications session with a correspondent host (2) of the system,
the mobile host (1) having an identifier (NAI) which is independent of the access network (3A, 3B) to which the mobile host (1) is attached, and
the mobile host (1) being assigned a communications address (IP Address) for carrying on an active communications session with a correspondent host (2), which communications address (IP address) changes, for example depending on the access network (3A. 3B) to which the mobile host (1) is currently attached,
a database (UNS - User Name Service) of the system registering the association of the mobile host identifier (NAI) and the current communications address (IP address) of the mobile host (1),
the correspondent host (2) being informed of the identifier (NAI) of the mobile host (1) when an active communications session is first established between the mobile host (1) and the correspondent host (2),
the correspondent host (2) accessing the database (UNS) to determine the current communications address of the mobile host (1), for use in communicating with the mobile host (1),
wherein
the mobile host (1) comprises a control unit (1A) which
maintains a record of the correspondent host (2) with which the mobile host (1) is engaged in an active communications session,
detects when the communications address (IP address) of the mobile host (1) changes, for example as a result of attachment of the mobile host (1) to a different access network (3A, 3B),

and

upon detection of such a change of the communications address (IP address), sends a message (HANDOVER MESSAGE) to the recorded correspondent host (2), the message containing the mobile host's (1) identifier (NAI);

the correspondent host (2) then using the identifier (NAI) to access the database (UNS) to obtain the changed communications address (IP address) of the mobile host (1), for use in further communicating with the mobile host (1).

2. A system as in claim 1, wherein said message (HANDOVER MESSAGE) also contains the mobile host's (1) changed communications address (IP address).

3. A system as claimed in claim 1 or 2, wherein the access networks are wireless access networks, and communications between the mobile host (1) and the correspondent host (2) are carried out via the Internet.

4. A method of maintaining an active communications session of a mobile host (1) with a correspondent host (2), which mobile host can attach to different access networks (3A, 3B) for carrying on a communications session with the correspondent host (2), during migration of the mobile host (1) from one access network to another, the method comprising:-

assigning an identifier (NAI) to the mobile host (1), which identifier is independent of the access network (3A, 3B) to which the mobile host (1) is attached, and

assigning a communications address (IP Address) to the mobile host (1), for carrying on an active communications session with the correspondent host (2), which communications

address (IP address) changes, for example depending on the access network (3A. 3B) to which the mobile host (1) is currently attached,

registering in a database (UNS - User Name Service) the association of the mobile host identifier (NAI) and the current communications address (IP address) of the mobile host (1),

informing the correspondent host (2) of the identifier (NAI) of the mobile host (1) when an active communications session is first established between the mobile host (1) and the correspondent host (2), the correspondent host (2) accessing the database (UNS) to determine the current communications address of the mobile host (1), for use in communicating with the mobile host (1),

and the method further comprising

maintaining, in a control unit (1A) of the mobile host (1), a record of the correspondent host (2) with which the mobile host (1) is engaged in an active communications session,

detecting when the communications address (IP address) of the mobile host (1) changes, for example as a result of attachment of the mobile host (1) to a different access network (3A, 3B), and

upon detection of such a change of the communications address (IP address), sending a message (HANDOVER MESSAGE) to the recorded correspondent host (2), the message containing the mobile host's (1) identifier (NAI);

the correspondent host (2) then using the identifier (NAI) to access the database (UNS) to obtain the changed communications address (IP address) of the mobile host (1), for use in further communicating with the mobile host (1).

5. A method as in claim 4, comprising sending also the mobile host's (1) changed communications address (IP address) in said message (HANDOVER MESSAGE).

6. A method as claimed in claim 4 or 5, wherein wireless access networks are employed as the access networks, and communications between the mobile host (1) and the correspondent host (2) are carried out via the Internet.

7. A mobile host which can attach to different access networks (3A, 3B) for carrying on a communications session with a correspondent host,

the mobile host (1) having an assigned identifier (NAI), which identifier is independent of the access network (3A, 3B) to which the mobile host (1) is attached,

the mobile host (1) having an assigned a communications address (IP Address), for use in carrying on an active communications session with the correspondent host (2), which communications address (IP address) changes, for example depending on the access network (3A. 3B) to which the mobile host (1) is currently attached, and

the mobile host (1) being operable to inform the correspondent host (2) of the identifier (NAI) of the mobile host (1) when an active communications session is first established between the mobile host (1) and the correspondent host (2),

and the mobile host (1) further comprising:-

a control unit (1A) operable to store a record of the correspondent host (2) with which the mobile host (1) is engaged in an active communications session,

a detector which is operable to detect

when the communications address (IP address) of the mobile host (1) changes, for example as a result of migration of the mobile host (1) from one access network (3A, 3B) to another, and

a sender which is operable, upon detection of such a change of the communications address (IP address), to send a message (HANDOVER MESSAGE) to the correspondent host (2), the message containing the mobile host's (1) identifier (NAI).

8. A mobile host as claimed in claim 7, wherein said sender operable to send said message (HANDOVER MESSAGE) is operable to send also the mobile host's (1) changed communications address (IP address) in said message.

9. A mobile host as claimed in claim 7 or 8, wherein the mobile host (1) can attach to wireless access networks, as the access networks, and is operable to communicate with the correspondent host (2) via a wireless access network and the Internet.

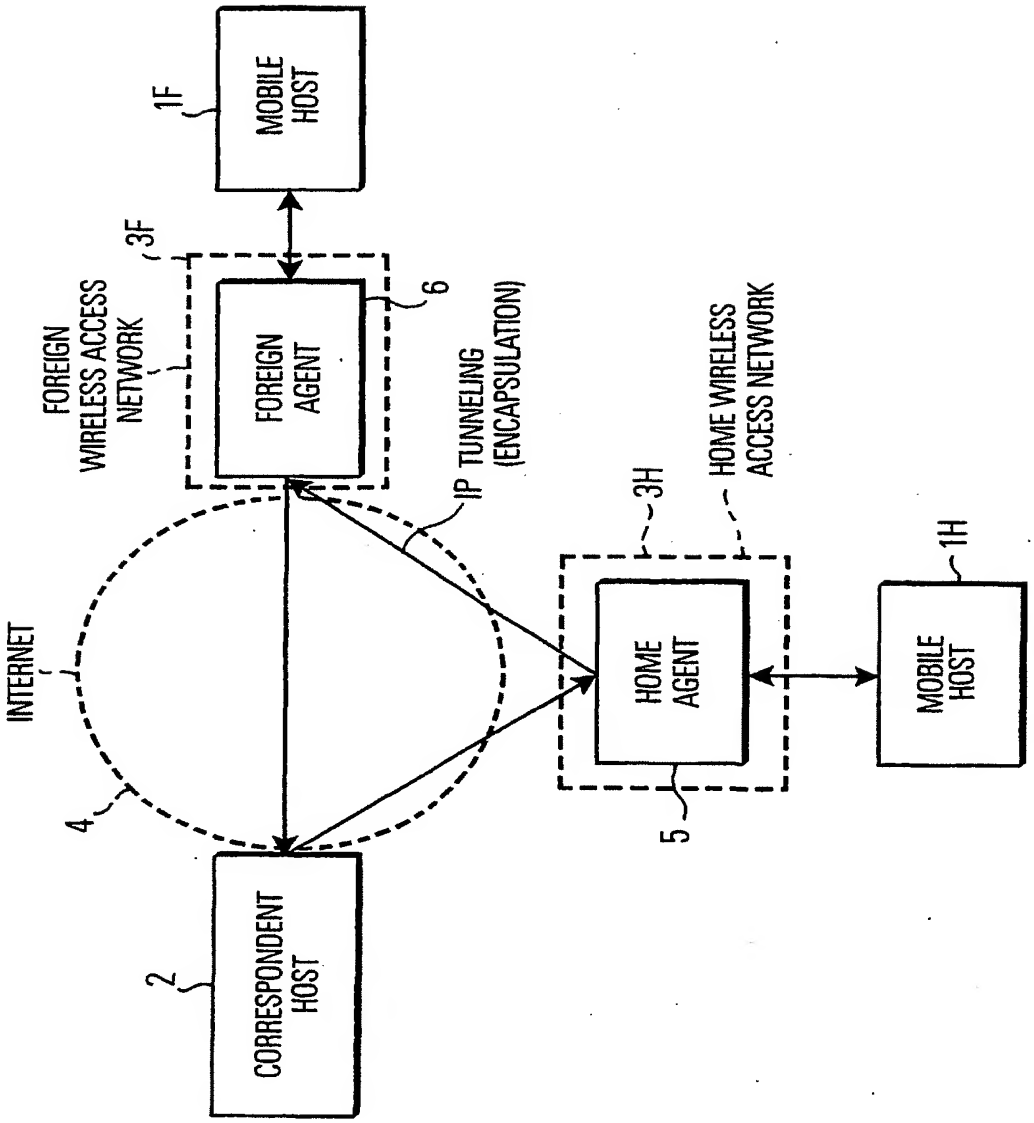

FIG.1 PRIOR ART

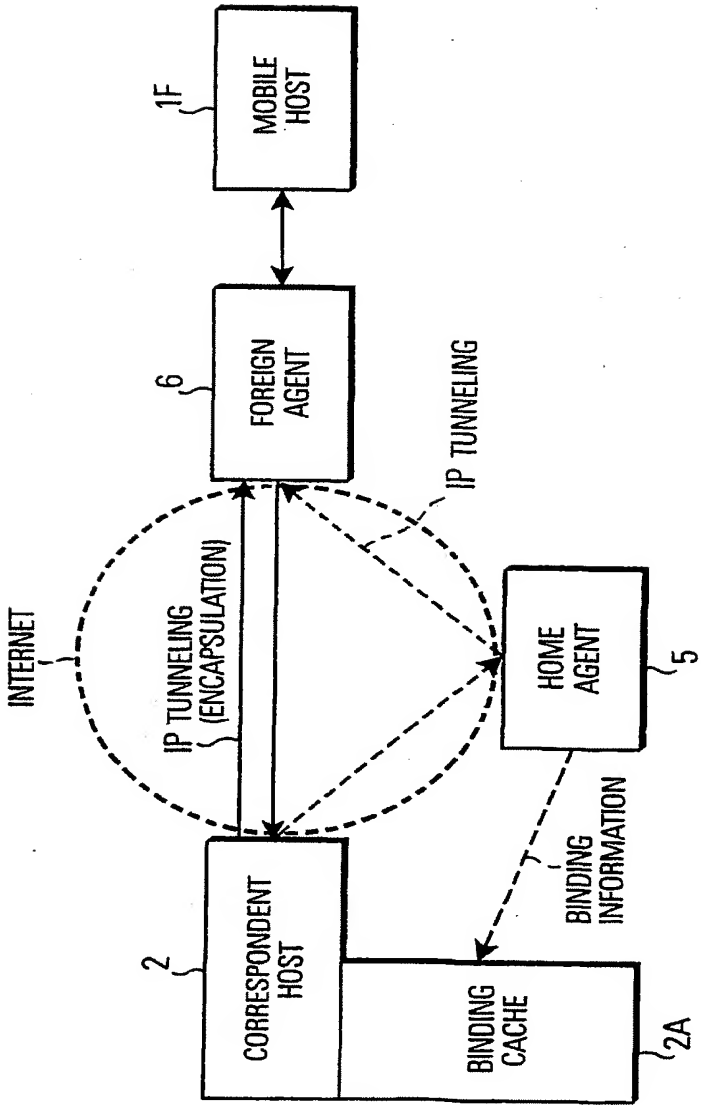

FIG.2 PRIOR ART

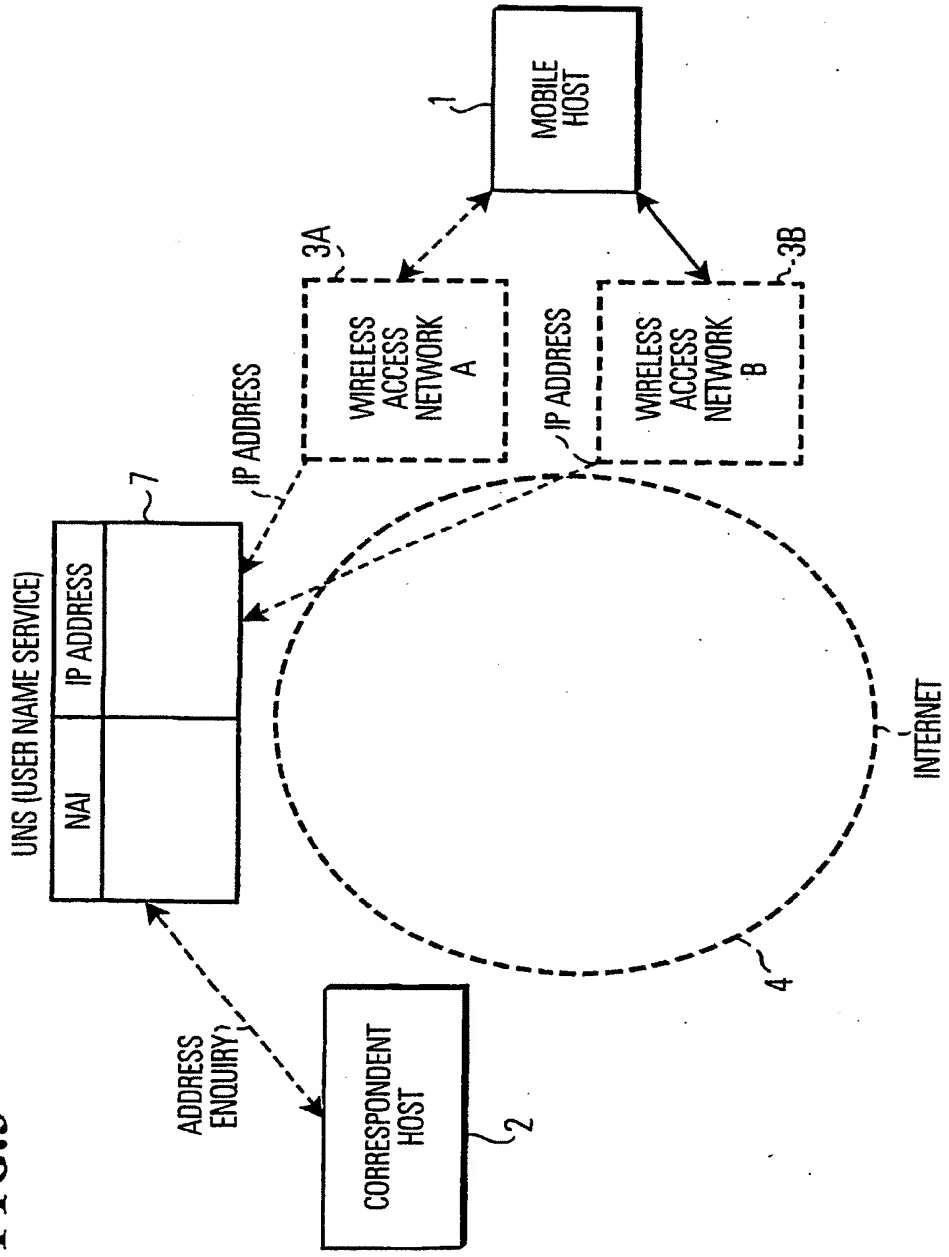

FIG.3

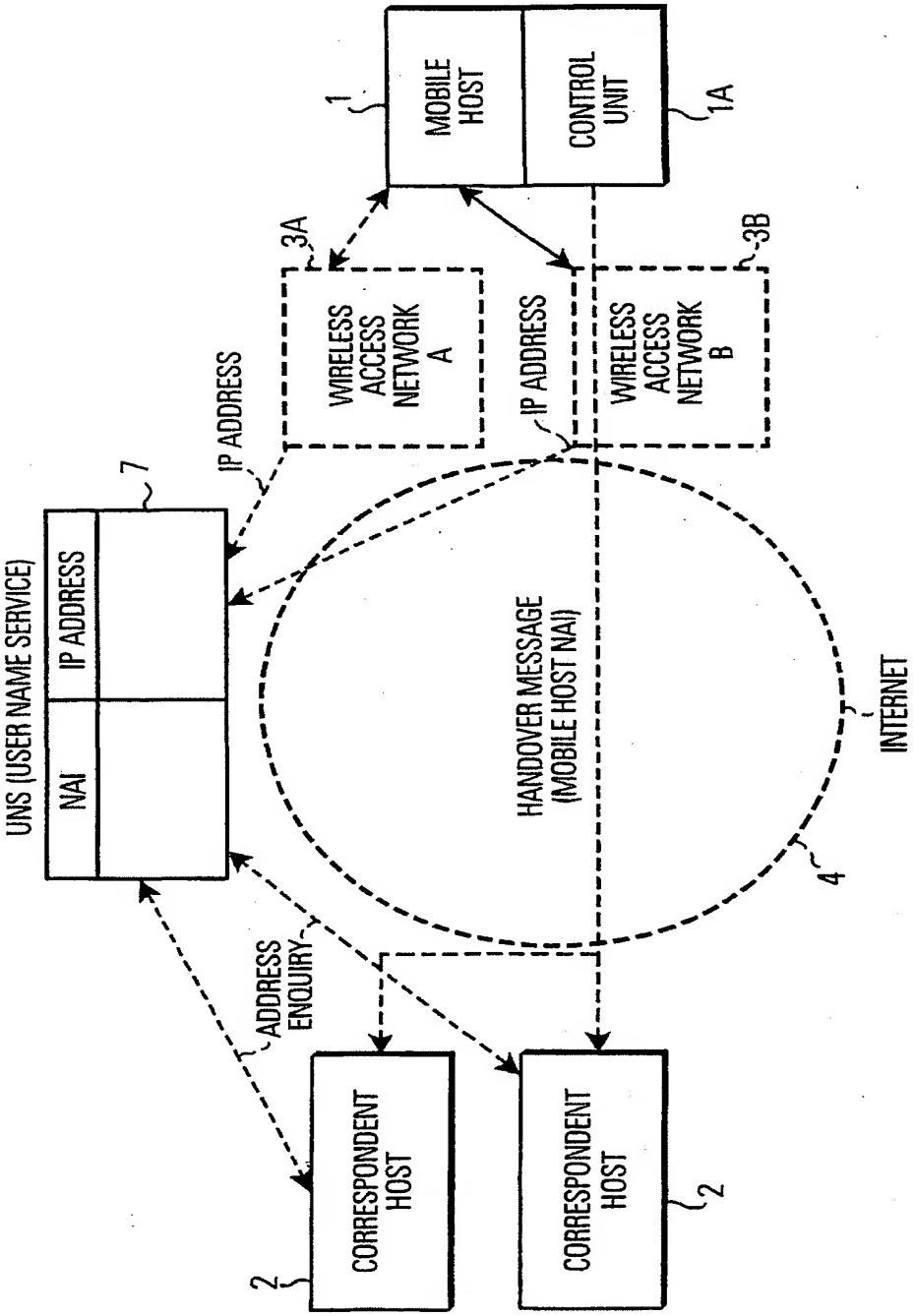
MOBILE HOST
CONTROL UNIT
1
1A
3A
3B
WIRELESS ACCESS NETWORK A
WIRELESS ACCESS NETWORK B
IP ADDRESS
IP ADDRESS
7
UNS (USER NAME SERVICE)
NAI
IP ADDRESS
HANDOVER MESSAGE (MOBILE HOST NAI)
INTERNET
4
ADDRESS ENQUIRY
CORRESPONDENT HOST
CORRESPONDENT HOST
2
2

FIG.4

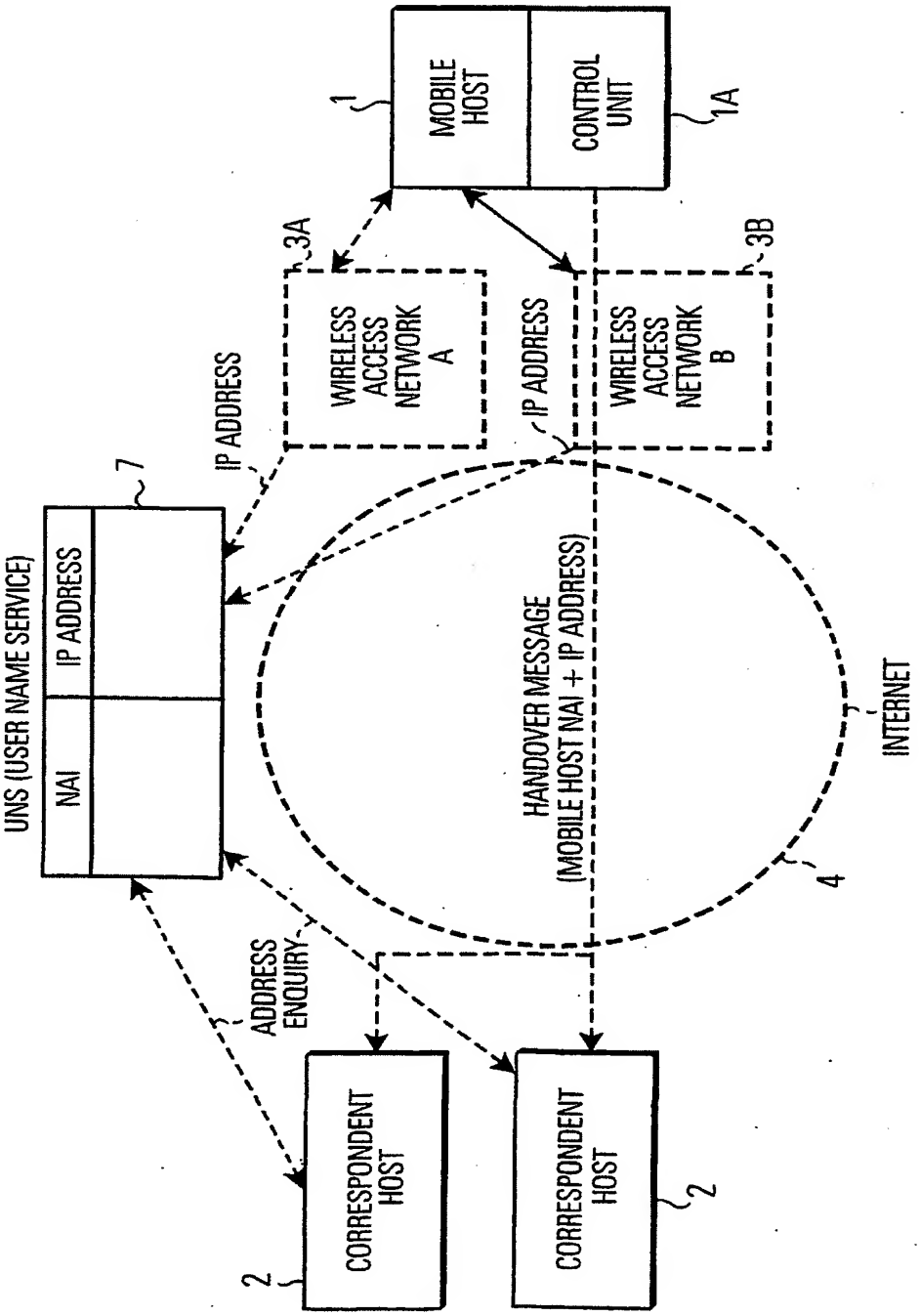

FIG.5

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
18 April 2002 (18.04.2002)

PCT

(10) International Publication Number
WO 02/032159 A3

(51) International Patent Classification[7]: H04L 29/06

(21) International Application Number: PCT/EP01/11384

(22) International Filing Date: 2 October 2001 (02.10.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0024677.7 9 October 2000 (09.10.2000) GB

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(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

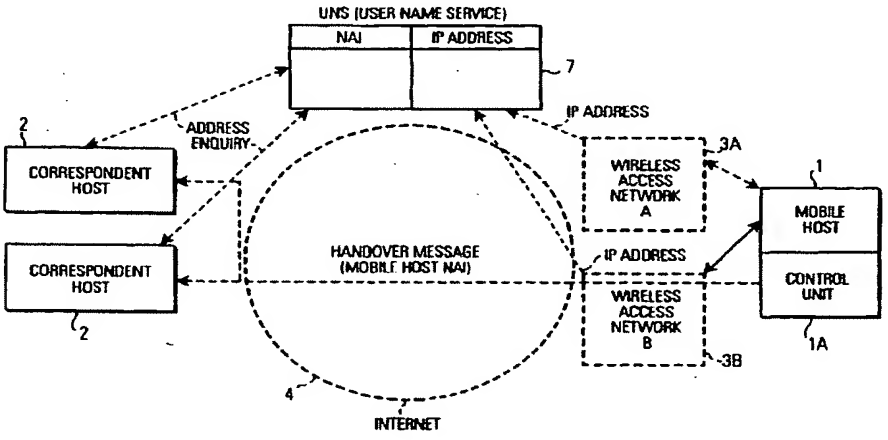
(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

(88) Date of publication of the international search report:
12 September 2002

[Continued on next page]

(54) Title: MOBILITY MANAGEMENT FOR MOBILE HOSTS



(57) Abstract: A system having a mobile host (1) which can attach to different access networks. The mobile host (1) has an identifier (NAI) which is independent of the access network (3A, 3B) to which the mobile host (1) is attached. The system has a database (UNS - User Name Service) which registers the association of the mobile host identifier (NAI) and the current communications address (IP address) of the mobile host (1). The mobile host (1) comprises a control unit (1A) which maintains a record of the correspondent host (2) with which the mobile host (1) is engaged in an active communications session; detects when the communications address (IP address) of the mobile host (1) changes, sends a message (HANDOVER MESSAGE) to the recorded correspondent host (2), the message containing the mobile host's (1) identifier (NAI). The correspondent host (2) then uses the identifier (NAI) to access the database (UNS) to obtain the changed communications address (IP address) of the mobile host (1).

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INTERNATIONAL SEARCH REPORT

Inter[redacted]nal Application No
PCT/EP 01/11384

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04L29/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	SCHULZRINNE H ET AL: "APPLICATION-LAYER MOBILITY USING SIP" MOBILE COMPUTING AND COMMUNICATIONS REVIEW, ACM, NEW YORK, NY, US, vol. 4, no. 3, July 2000 (2000-07), pages 47-57, XP000992003 page 50, right-hand column, paragraph III.B.1 -page 51, left-hand column, paragraph III.B.2 ---	1-9
Y	EP 1 017 208 A (LUCENT TECHNOLOGIES INC) 5 July 2000 (2000-07-05) page 4, paragraph 17 ---	1-9
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[X] Further documents are listed in the continuation of box C.

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Date of the actual completion of the international search	Date of mailing of the international search report
26 April 2002	27/05/2002

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax. (+31-70) 340-3016	Bernedo Azpiri, P

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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